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NATIONAL EUTROPHICATION SURVEY

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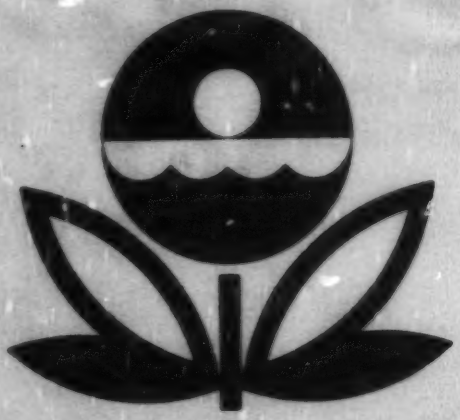

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16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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REPORT

ON

THOMAS HILL RESERVOIR

MACON AND RANDOLPH COUNTIES

MISSOURI

EPA REGION VII

WORKING PAPER No. 550

WITH THE COOPERATION OF THE

MISSOURI DEPARTMENT OF NATURAL RESOURCES

AND THE

MISSOURI NATIONAL GUARD

FEBRUARY, 1977

REPORT ON THOMAS HILL RESERVOIR

MACON AND RANDOLPH COUNTIES, MISSOURI

EPA REGION VII

by

National Eutrophication Survey

Water and Land Monitoring Survey
Monitoring Applications Laboratory
Environmental Monitoring & Support Laboratory
Las Vegas, Nevada

and

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Corvallis Environmental Research Laboratory
Corvallis, Oregon

Working Paper No. 550

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U.S. ENVIRONMENTAL PROTECTION AGENCY

February 1977

1-b

1-C

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Missouri Department of Natural Resources for professional involvement, to the Missouri National Guard for conducting the tributary sampling phase of the Survey, and to those Missouri wastewater treatment plant operators who provided effluent samples and flow data.

The staff of the Missouri Department of Natural Resources, James Wilson, Director; the Division of Environmental Quality, Ken Karch, Director; and the Water Quality Program, James Odendahl, Director, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper series.

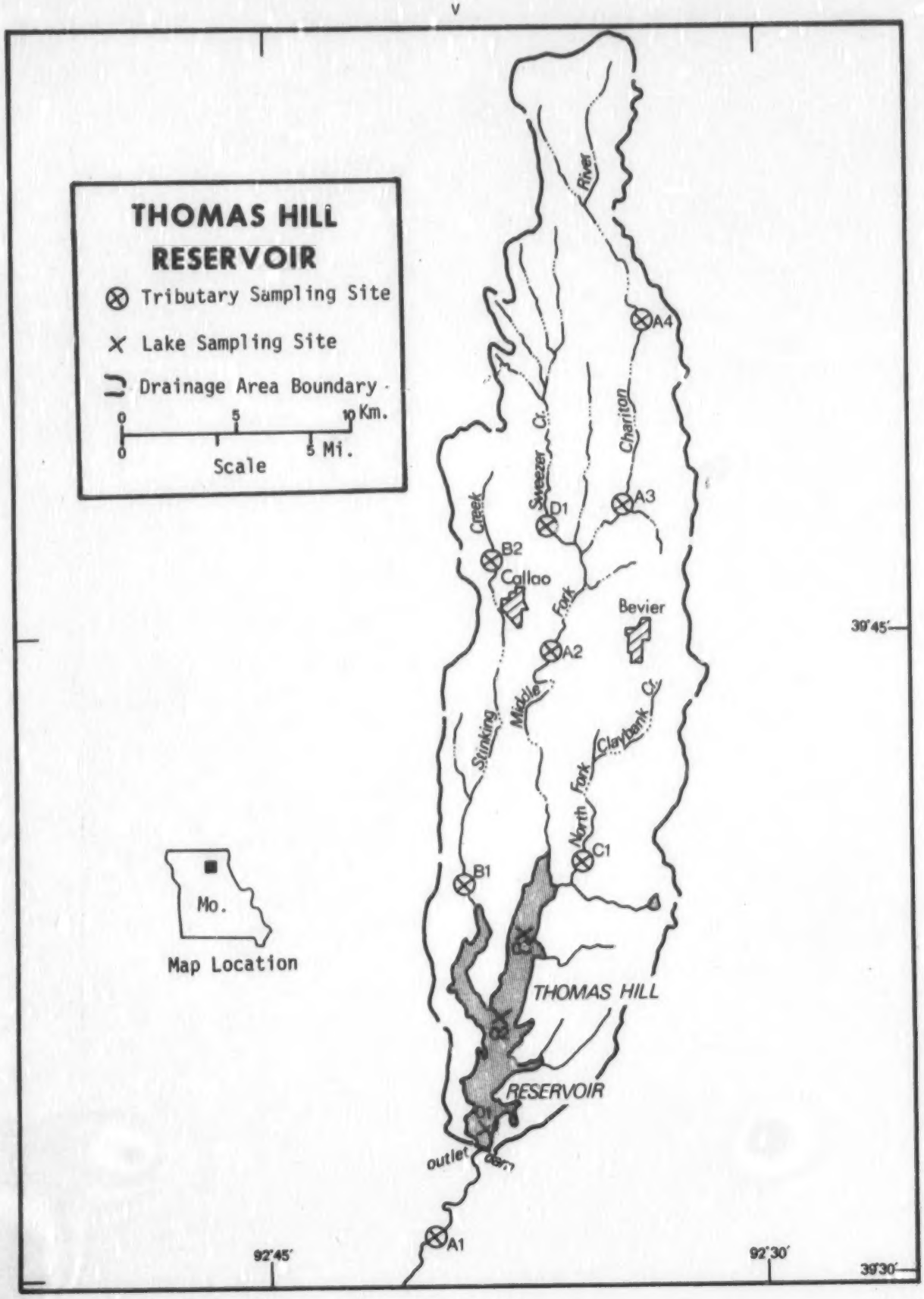
Major General Charles M. Kiefner, the Adjutant General of Missouri, and Project Officer Captain Donald L. Wellen, who directed the volunteer efforts of the Missouri National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF MISSOURI

LAKE NAME	COUNTY
Clearwater Lake	Reynolds
Pomme de Terre Reservoir	Polk, Hickory
Stockton Reservoir	Dade, Polk, Cedar
Lake Taneycomo	Taney
Thomas Hill Reservoir	Macon, Randolph
Lake Wappapello	Wayne, Butler


THOMAS HILL
RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Drainage Area Boundary
0 5 10 Km.
0 5 Mi.
Scale
Mo.
Map Location
River
Creek
Sweezer Cr.
Chariton
Callao
Fork
Bevier
Middle
Stinking
Claybank Cr.
North Fork
A4
A3
D1
B2
A2
C1
B1
THOMAS HILL
RESERVOIR
outlet
dam
A1
39°45'
92°45'
92°30'
39°30'

REPORT ON THOMAS HILL RESERVOIR, MISSOURI

STORET NO. 2905

I. CONCLUSIONS

A. Trophic Condition:*

On the basis of field observations and Survey data, Thomas Hill Reservoir is considered eutrophic, i.e., nutrient rich and potentially productive. Whether such nutrient enrichment is to be considered beneficial or deleterious is determined by its actual or potential impact upon designated beneficial water uses of the lake.

Chlorophyll a levels ranged from 0.9 µg/l in the summer to 28.4 µg/l in October, with a mean of 5.8 µg/l. Potential for primary production as measured by algal assay control yields was moderately low. Of the six Missouri lakes sampled in 1974, none had higher median total phosphorus, median inorganic nitrogen, or median dissolved orthophosphorus levels than Thomas Hill Reservoir.

Survey limnologists did not report any nuisance conditions during their visits to the lake. However, it was noted that the lake was highly turbid on all sampling occasions. The low Secchi disc transparencies (range of 0.2 to 0.5 m) coupled with high nutrient levels suggest that primary production in the lake is light-limited.

*See Appendix E.

B. Rate-Limiting Nutrient:

The algal assay results for Thomas Hill Reservoir indicate that phosphorus was the primary limiting nutrient at the times samples were collected (04/08/74, 10/06/74). The lake data further indicate phosphorus as the limiting nutrient in the sampled waters.

C. Nutrient Controllability:

1. Point sources -

There were no known point sources impacting Thomas Hill Reservoir during the sampling year. The present calculated loading of 0.48 g $P/m^2/yr$ is slightly above that proposed by Vollenweider (1975) as eutrophic for lakes with such volume and retention time. However, the actual annual loading may be somewhat higher since nutrient loading for the ungaged tributaries entering the lake were estimated from background loadings for tributary A-2, the Middle Fork Cariton River; the nutrient concentrations in that tributary are substantially lower than several of the other ungaged tributaries sampled. (see Sections IV-D,E).

2. Nonpoint sources -

The Middle Fork Cariton River accounted for 44.2% of the total loading reaching Thomas Hill Reservoir during the sampling year, and ungaged drainage areas were estimated to account for 52.1%.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake surface area and mean depth were provided by the Missouri Clean Water Commission. Maximum depth was estimated on the basis of Survey data. Tributary flow data were provided by the Missouri District Office of the U.S. Geological Survey (USGS). Outlet drainage area includes the lake surface area. Mean hydraulic retention time was obtained by dividing the lake volume by the mean flow of the outlet. Precipitation values are estimated by methods as outlined in National Eutrophication Survey (NES) Working Paper No. 175. A table of metric/English conversions is included as Appendix A.

A. Lake Morphometry:

1. Surface area: 17.81 km^2.
2. Mean depth: 4.1 meters.
3. Maximum depth: 12.2 meters.
4. Volume: 73.021 x 10^6 m^3.
5. Mean hydraulic retention time: 427 days (1.2 yrs).

B. Tributary and Outlet:
(See Appendix B for flow data)

1. Tributaries -

Name	Drainage area(km^2)	Mean flow (m^3/sec)
A-2 Middle Fork Cariton River	168.3	0.94
Minor tributaries and immediate drainage -	202.3	1.20
Totals	370.6	2.14
2. Outlet - A-1 Middle Fork Cariton River	388.5	1.98

C. Precipitation:

1. Year of sampling: 102.9 cm.
2. Mean annual: 98.3 cm.

III. LAKE WATER QUALITY SUMMARY

Thomas Hill Reservoir was sampled three times during the open-water season of 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from three stations on the lake and from a number of depths at each station (see map, page v). During each visit, depth-integrated samples were collected from each station for chlorophyll a analysis and phytoplankton identification and enumeration. During the first and last visits, 18.9-liter depth-integrated samples were composited for algal assays. Maximum depths sampled were 11.0 meters at Station 01, 5.8 meters at Station 02, and 2.4 meters at Station 03. For a more detailed explanation of NES methods, see NES Working Paper No. 175.

The results obtained are presented in full in Appendix C and are summarized in III-A for waters at the surface and at the maximum depth for each site. Results of the phytoplankton counts and chlorophyll a determinations are included in III-B. Results of the limiting nutrient study are presented in III-C.

THOMAS HILL RESERVOIR
STORET CODE 2905

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	(4/ 8/74) S*** = 3 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	(6/20/74) S*** = 3 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	(10/ 7/74) S*** = 3 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)												
0.-1.5 M DEPTH	6	9.3- 10.2	9.6	0.0- 1.5	5	24.3- 25.7	25.2	0.0- 1.5	6	13.9- 17.5	15.8	0.0- 1.5
MAX DEPTH**	3	9.5- 10.2	9.6	2.4- 6.1	3	21.0- 25.6	24.7	1.8- 11.0	3	13.9- 17.3	14.9	1.5- 8.5
DISSOLVED OXYGEN (MG/L)												
0.-1.5 M DEPTH	3	10.2- 10.2	10.2	1.5- 1.5	5	6.4- 7.2	7.0	0.0- 1.5	6	7.4- 9.6	8.8	0.0- 1.5
MAX DEPTH**	3	9.0- 10.2	10.2	2.4- 6.1	3	3.8- 6.8	6.0	1.8- 11.0	3	7.4- 9.0	8.4	1.5- 8.5
CONDUCTIVITY (UMHOS)												
0.-1.5 M DEPTH	6	12.- 126.	56.	0.0- 1.5	5	266.- 286.	285.	0.0- 1.5	6	248.- 260.	254.	0.0- 1.5
MAX DEPTH**	3	133.- 151.	137.	2.4- 6.1	3	265.- 320.	285.	1.8- 11.0	3	247.- 257.	252.	1.5- 8.5
PH (STANDARD UNITS)												
0.-1.5 M DEPTH	6	7.6- 7.7	7.6	0.0- 1.5	5	7.4- 7.9	7.7	0.0- 1.5	6	7.5- 7.8	7.7	0.0- 1.5
MAX DEPTH**	3	7.6- 7.7	7.7	2.4- 6.1	3	7.3- 7.6	7.6	1.8- 11.0	3	7.5- 7.8	7.7	1.5- 8.5
TOTAL ALKALINITY (MG/L)												
0.-1.5 M DEPTH	6	41.- 73.	49.	0.0- 1.5	5	55.- 61.	55.	0.0- 1.5	6	64.- 67.	66.	0.0- 1.5
MAX DEPTH**	3	46.- 48.	47.	2.4- 6.1	3	56.- 58.	57.	1.8- 11.0	3	64.- 67.	64.	1.5- 8.5
TOTAL P (MG/L)												
0.-1.5 M DEPTH	6	0.080-0.125	0.085	0.0- 1.5	5	0.084-3.480	0.087	0.0- 1.5	6	0.031-0.069	0.042	0.0- 1.5
MAX DEPTH**	3	0.025-0.121	0.078	2.4- 6.1	3	0.082-0.228	0.112	1.8- 11.0	3	0.030-0.061	0.036	1.5- 8.5
DISSOLVED ORTHO P (MG/L)												
0.-1.5 M DEPTH	6	0.011-0.020	0.012	0.0- 1.5	5	0.011-2.540	0.028	0.0- 1.5	6	0.004-0.017	0.007	0.0- 1.5
MAX DEPTH**	3	0.008-0.012	0.011	2.4- 6.1	3	0.009-0.124	0.011	1.8- 11.0	3	0.004-0.007	0.006	1.5- 8.5
NO2+NO3 (MG/L)												
0.-1.5 M DEPTH	6	0.930-1.020	0.945	0.0- 1.5	5	0.930-1.260	0.990	0.0- 1.5	6	0.210-0.600	0.560	0.0- 1.5
MAX DEPTH**	3	0.900-1.000	0.980	2.4- 6.1	3	0.900-0.960	0.930	1.8- 11.0	3	0.210-0.570	0.560	1.5- 8.5
AMMONIA (MG/L)												
0.-1.5 M DEPTH	6	0.050-0.170	0.110	0.0- 1.5	5	0.050-0.160	0.080	0.0- 1.5	6	0.020-0.050	0.030	0.0- 1.5
MAX DEPTH**	3	0.080-0.150	0.090	2.4- 6.1	3	0.060-0.100	0.080	1.8- 11.0	3	0.020-0.030	0.020	1.5- 8.5
KJELDAHL N (MG/L)												
0.-1.5 M DEPTH	6	0.500-0.800	0.700	0.0- 1.5	5	0.600-1.900	0.900	0.0- 1.5	6	0.500-1.100	0.850	0.0- 1.5
MAX DEPTH**	3	0.400-0.700	0.500	2.4- 6.1	3	0.600-0.600	0.600	1.8- 11.0	3	0.400-0.800	0.500	1.5- 8.5
SECCHI DISC (METERS)	3	0.2- 0.3	0.3		3	0.2- 0.3	0.2		3	0.3- 0.5	0.5	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
04/08/74	1. Chroomonas	140
	2. Cryptomonas	94
	3. Schroederia	94
	4. Nitzschia	47
	Other genera	---
	Total	375
06/20/74	1. Chroomonas	253
	2. Stephanodiscus	253
	3. Cryptomonas	211
	4. Melosira	169
	5. Closterium	42
	Other genera	---
	Total	928
10/07/74	1. Stephanodiscus	2,045
	2. Nitzschia	1,217
	3. Melosira	682
	4. Skeletonema	682
	5. Chroomonas	341
	Other genera	1,070
	Total	6,037

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (µg/l)
04/08/74	01	2.1
	02	2.2
	03	---
06/20/74	01	0.9
	02	2.4
	03	2.3
10/07/74	01	3.2
	02	4.8
	03	28.4

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. 04/08/74

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum Yield (mg/l-dry wt.)
Control	0.005	0.940	0.2
0.05 P	0.055	0.940	8.0
0.05 P + 1.0 N	0.055	1.940	8.4
1.00 N	0.005	1.940	0.2

b. 10/06/74

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum Yield (mg/l-dry wt.)
Control	0.005	0.475	0.8
0.05 P	0.055	0.475	9.6
0.05 P + 1.0 N	0.055	1.475	15.9
1.00 N	0.005	1.475	0.8

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential for primary production in Thomas Hill Reservoir was low at the time of spring sampling and moderate during fall. On both sampling occasions, an increase in growth yield with the addition of phosphorus, as well as the lack of increase with the addition of nitrogen alone, indicates phosphorus limitation. Maximum growth yield was achieved with the simultaneous addition of both nutrients. It should be noted, however, that phosphorus levels in the control samples were generally much lower than determined for preserved lake water samples. This loss of phosphorus in the

assay samples probably accounts for the apparent low to moderate control yield.

Mean N/P ratios were 90/1 and 69/1 in the spring and autumn sampling data, indicating phosphorus limitation at those times. N/P ratios in the summer were 80/1 for Stations 02 and 03, but only 2/1 for Station 01 due to the inordinately high surface phosphorus values observed during June at that station.

IV. NUTRIENT LOADINGS
(See Appendix D for data)

For the determination of nutrient loadings, the Missouri National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of October, April, and May when two samples were collected. Sampling was begun in September 1974, and was completed in August 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Missouri District Office of the USGS for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a USGS computer program for calculating stream loadings. Nutrient loads indicated for tributaries are those measured minus known point source loads, if any.

Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of USGS) were estimated by using the mean annual nutrient loads, in $kg/km^2/yr$, for the Middle Fork Cariton River at Station A-2, and multiplying the means by the ZZ area in km^2.

A. Waste Sources:

1. Known municipal - None known.

2. Known industrial - None known.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Middle Fork Cariton River	3,770	44.2
b. Minor tributaries and immediate drainage (nonpoint load) -	4,450	52.1
c. Known municipal STP's - None		
d. Septic tanks* -	5	0.1
e. Known industrial - None		
f. Direct precipitation** -	310	3.6
Totals	8,535	100.0

2. Output - A-1 Middle Fork Cariton River 3,700

3. Net annual P accumulation - 4,835

*Estimate based on 20 lakeshore residences.
**Estimate (see NES Working Paper No. 175).

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Middle Fork Cariton River	83,690	41.1
b. Minor tributaries and immediate drainage (nonpoint load) -	100,545	49.4
c. Known municipal STP's - None		
d. Septic tanks* -	215	0.1
e. Known industrial - None		
f. Direct precipitation** -	19,230	9.4
Totals	203,680	100.0

2. Output - A-1 Middle Fork Cariton River 107,770

3. Net annual N accumulation - 95,910

*Estimated based on 20 lakeshore residences.
**Estimated (see NES Working Paper No. 175).

D. Mean annual Nonpoint Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Middle Fork Cariton River	22	497

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P (mg/l)	Mean Total N (mg/l)
A-3 Middle Fork Cariton River	0.138	2.296
A-4 Middle Fork Cariton River	0.254	2.849
B-1 Stinking Creek	0.193	2.775
B-2 Stinking Creek	0.175	2.764
C-1 North Fork Claybank Creek	0.068	2.038
D-1 Sweezer Creek	0.160	2.400
E-1 Unnamed Creek	0.044	1.067
F-1 Unnamed Creek	0.093	1.161

Nutrient concentrations for the ungaged tributaries C-1, E-1, and F-1 are in line with site A-2, the Middle Fork Cariton River, while phosphorus levels for the remaining ungaged tributaries are much higher than at Station A-2.

F. Yearly Loadings:

In the following table, the existing phosphorus annual loading is compared to the relationship proposed by Vollenweider (1975). Essentially his eutrophic loading is that at which the receiving waters would become eutrophic or remain eutrophic; his oligotrophic loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between eutrophic and oligotrophic.

Note that Vollenweider's model may not apply to lakes with short hydraulic retention times or in which light penetration is severely restricted by high concentrations of suspended solids in the surface waters.

	Total Yearly Phosphorus Loading ($g/m^2/yr$)
Estimated loading for Thomas Hill Reservoir	0.48
Vollenweider's eutrophic loading	0.36
Vollenweider's oligotrophic loading	0.18

V. LITERATURE REVIEWED

U.S. Environmental Protection Agency. 1975. National Eutrophication Survey Methods 1973-1976. Working Paper No. 175. National Environmental Research Center, Las Vegas, Nevada, and Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

Vollenweider, R. A. 1975. Input-Output Models With Special Reference to the Phosphorus Loading Concept in Limnology. Schweiz. Z. Hydrol. 37:53-84.

VI. APPENDICES

APPENDIX A

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX B

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR MISSOURI 02/24/77

LAKE CODE 2905 THOMAS HILL RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 388.5

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
2905A1	388.5	1.47	2.83	2.69	3.68	2.80	3.68	2.10	0.68	1.25	1.02	0.96	0.71	1.98
2905A2	168.3	0.65	1.25	1.19	1.70	1.36	1.73	1.05	0.42	0.68	0.57	0.45	0.34	0.94
2905ZZ	220.1	0.82	1.59	1.50	2.15	1.73	2.21	1.33	0.54	0.85	0.74	0.57	0.42	1.20

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 388.5
SUM OF SUB-DRAINAGE AREAS = 388.5

TOTAL FLOW IN = 25.82
TOTAL FLOW OUT = 23.87

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
2905A1	9	74	1.699	14	0.425				
	10	74	0.850	5	0.566	27	0.708		
	11	74	0.906						
	12	74	0.708	7	1.416				
	1	75	0.991	4	3.964				
	2	75	4.248	1	4.248				
	3	75	2.407	2	2.549				
	4	75	4.248	8	3.115	19	3.256		
	5	75	2.265	4	2.832	17	3.964		
	6	75	2.265	7	4.531				
	7	75	1.416	13	0.850				
	8	75	0.425	16	0.708				
2905A2	9	74	0.011	14	0.014				
	10	74	0.028	5	0.011	27	0.017		
	11	74	0.425						
	12	74	0.368	7	0.680				
	1	75	0.425	4	0.708				
	2	75	1.982	1	1.133				
	3	75	1.133	1	0.991				
	4	75	1.982	5	1.416	19	0.425		
	5	75	1.274	4	0.283	17	0.184		
	6	75	0.425	8	0.170				
	7	75	0.042	12	0.014				
	8	75	0.057	16	0.003				
2905ZZ	9	74	0.311						
	10	74	0.340						
	11	74	0.793						
	12	74	0.765						
	1	75	0.821						
	2	75	2.803						
	3	75	1.727						
	4	75	2.803						
	5	75	1.897						
	6	75	0.850						
	7	75	0.340						
	8	75	0.340						

120

APPENDIX C

PHYSICAL AND CHEMICAL DATA

STORET RETRIEVAL DATE 77/02/24

290501
39 31 29.0 092 38 .2.0 3
THOMAS HILL RESERVOIR
29175 MISSOURI
091391

/TYPA/AMYNT/LAKE

11EPALES 04001002
0028 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/04/08	13	0000	10.2		12	13	7.70	73	0.100	0.800	0.940	0.011
	13	0005	10.2	10.2		63	7.60	41	0.050	0.500	0.950	0.020
	13	0015	10.2	10.2		130	7.60	45	0.080	0.500	1.000	0.010
	13	0020	10.2	9.0		137	7.60	47	0.080	0.400	0.980	0.008
74/06/20	11	0000	24.3	7.0	9	285	7.90	61	0.160	1.900	1.260	2.540
	11	0005	24.3	6.4		280	7.60	55	0.080	0.700	1.000	0.038
	11	0015	22.3	5.8		269	7.50	55	0.070	0.600	0.970	0.052
	11	0025	21.8	5.6		264	7.40	54	0.080	0.600	1.030	0.018
	11	0030	21.2	4.6		268	7.40	56	0.090	0.600	0.970	0.018
	11	0036	21.0	3.8		320	7.30	57	0.100	0.600	0.930	0.124
74/10/07	11	0000	17.5	8.4	18	257	7.52	66	0.050	1.100	0.600	0.017
	11	0005	17.5	8.6		260	7.64	64	0.030	0.500	0.580	0.007
	11	0015	17.5	8.6		259	7.58	65	0.030	0.500	0.580	0.005
	11	0028	17.3	8.4		257	7.49	64	0.030	0.500	0.570	0.007

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/08	13	0000	0.082	2.1	
	13	0005	0.080		
	13	0015	0.078		
	13	0020	0.078		
74/06/20	11	0000	3.480	0.9	
	11	0005	0.084		
	11	0015	0.102		
	11	0025	0.099		
	11	0030	0.126		
	11	0036	0.228		
74/10/07	11	0000	0.042	3.2	
	11	0004			1.0
	11	0005	0.031		
	11	0015	0.028		
	11	0028	0.036		

STORET RETRIEVAL DATE 77/02/24

290502
39 35 59.0 092 38 12.0 3
THOMAS HILL RESERVOIR
29175 MISSOURI

091391

/TYPA/AMBNT/LAKE

11EPALES 04001002
0023 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/04/08	13 30	0000	9.7		12	12	7.60	48	0.120	0.800	1.020	0.013
	13 30	0005	9.6	10.2		51	7.60	48	0.070	0.500	0.970	0.012
	13 30	0015	9.6	10.2		133	7.70	46	0.090	0.500	1.000	0.012
74/06/20	12 00	0000	25.2	7.0	8	286	7.70	55	0.080	0.900	0.960	0.028
	12 00	0005	25.4	7.2		286	7.40	57	0.050	0.600	0.990	0.013
	12 00	0010	24.9	7.0		286	7.60	54	0.050	0.600	1.030	0.011
	12 00	0015	24.7	7.2		285	7.60	55	0.070	0.500	1.000	0.010
	12 00	0019	24.7	6.0		285	7.60	58	0.060	0.600	0.900	0.009
74/10/07	12 00	0000	15.9	9.0	18	252	7.64	65	0.040	1.100	0.560	0.010
	12 00	0005	15.8	9.2		248	7.69	64	0.030	0.500	0.560	0.006
	12 00	0018	14.9	9.0		247	7.74	64	0.020	0.400	0.500	0.006

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/08	13 30	0000	0.089	2.2	
	13 30	0005	0.081		
	13 30	0015	0.025		
74/06/20	12 00	0000	0.087	2.4	
	12 00	0005	0.085		
	12 00	0010	0.076		
	12 00	0015	0.086		
	12 00	0019	0.082		
74/10/07	12 00	0000	0.042	4.8	
	12 00	0003			1.0
	12 00	0005	0.033		
	12 00	0018	0.030		

VT 23 A

STORET RETRIEVAL DATE 77/02/24

290503
39 37 29.0 092 37 20.0 3
THOMAS HILL RESERVOIR
29121 MISSOURI

091391

/TYPA/AMBNT/LAKE

11EPALES 04001002
0011 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/04/08	13 50	0000	9.5		9	60	7.70	51	0.170	0.800	0.930	0.015
	13 50	0005	9.3	10.2		126	7.70	49	0.170	0.600	0.940	0.012
	13 50	0008	9.5	10.2		151	7.70	48	0.150	0.700	0.900	0.011
74/06/20	12 45	0000	25.7	6.8	10	266	7.80	55	0.100	0.900	0.930	0.011
	12 45	0006	25.6	6.8		265	7.60	56	0.080	0.600	0.960	0.011
74/10/07	12 30	0000	14.0	9.6	13	255	7.83	67	0.030	0.900	0.230	0.008
	12 30	0005	13.9	7.4		252	7.75	67	0.020	0.800	0.210	0.004

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/08	13 50	0000	0.125		
	13 50	0005	0.098		
	13 50	0008	0.121		
74/06/20	12 45	0000	0.124	2.3	
	12 45	0006	0.112		
74/10/07	12 30	0000	0.069	28.4	
	12 30	0003			1.0
	12 30	0005	0.061		

APPENDIX D

TRIBUTARY DATA

STORET RETRIEVAL DATE 77/02/24

2405A1
39 30 52.0 092 39 54.0 4
MID FORK C[illegible]RITON RIVER
29 7.5 PRAIRIE HILL
O/THOMAS HILL RESERVOIR 091391
MO HWY 3 BRDG .5 MI SW OF THOMAS HILL
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	10 30		0.480	1.700	0.020	0.005	0.060
74/10/05	09 30		0.464	0.800	0.300	0.005K	0.055
74/10/27	13 30		0.336	1.700	0.035	0.005K	0.040
74/12/07	09 05		0.400	1.400	0.090	0.010	0.080
75/01/04	14 00		0.352	1.400	0.104	0.005	0.040
75/02/01	09 55		0.397	1.700	0.176	0.008K	0.050
75/03/02	09 35		0.432	0.820	0.024	0.008K	0.079
75/04/08	12 00		0.490	1.400	0.070	0.005K	0.040
75/04/19	08 55		0.500	1.450	0.030	0.015	0.050
75/05/04	15 30		0.550	0.700	0.080	0.010	0.060
75/05/17	09 00		0.580	1.100	0.120	0.010	0.090
75/06/07	09 30		0.630	1.250	0.030	0.010	0.070
75/07/13	09 30		0.450	0.750	0.030	0.005K	0.040
75/08/16	09 20		0.260	1.150	0.060	0.005	0.080

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2905A2
39 44 23.0 092 36 30.0 4
MID FORK CHARITON RIVER
29 7.5 BEVIER SOUTH
T/THOMAS HILL RESERVOIR 091391
SEC RD BRDG 2.5 MI ESE OF BEVIER
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	15	40	0.040	1.300	0.100	0.005K	0.030
74/10/05	10	40	0.016	0.600	0.095	0.005K	0.040
74/10/27	14	45	0.024	1.300	0.110	0.010	0.080
74/12/07	11	00	1.520	3.600	0.155	0.035	
75/01/04	10	45	0.774	2.000	0.376	0.010	0.070
75/02/01	11	35	0.610	0.800	0.096	0.016	0.100
75/03/01	11	35	1.100	1.630	0.128		0.205
75/04/05	11	00	1.160	1.450	0.125	0.020	0.180
75/04/19	10	15	0.012	2.700	0.037	0.015	0.100
75/05/04	10	22	0.200	0.800	0.025	0.010	0.070
75/05/17	12	08	0.045	1.030	0.175	0.005	0.035
75/06/08	10	50	1.500	1.900	0.060	0.020	0.130
75/07/12	10	40	0.060	1.250	0.070	0.005	0.030
75/08/16	10	30	0.010	1.050	0.030	0.010	0.070

K VALUE KNOWN TO BE
LESS THAN INDICATED

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STORET RETRIEVAL DATE 77/02/24

2905A3
39 48 00.0 092 34 20.0 4
MID FORK CHARITON RIVER
29 MACON CO HWY MAP
T/THOMAS MILL RESERVOIR 091391
CO HWY OO BRDG 3 MI N OF BEVIER
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	12 00		0.330	1.200	0.025	0.020	0.120
74/10/12	12 35		0.032	1.700	0.050	0.025	0.130
74/11/02	11 10		0.016	1.700	0.037	0.035	0.170
74/12/07	12 05		1.760	3.700	0.075	0.045	0.350
75/01/04	10 45		0.920	1.300	0.104	0.010	0.060
75/02/01	10 30		0.528	0.700	0.056	0.016	0.050
75/03/01	11 00		1.250	1.950	0.084	0.025	0.200
75/04/05	11 30		1.150	1.750	0.085	0.025	0.180
75/04/19	14 45		0.005	0.600	0.005	0.015	0.090
75/05/04	11 30		0.400	2.900	0.050	0.015	0.120
75/05/17	10 50		0.155	0.800	0.035	0.010	0.060
75/06/07	10 40		1.950	2.200	0.200	0.025	0.180
75/06/22	12 50		0.040	1.400	0.030	0.010	0.120
75/07/12	08 30		0.195	1.150	0.080	0.010	0.090
75/08/23	10 45		0.010	1.650	0.035	0.020	0.150

STORET RETRIEVAL DATE 77/02/24

2905A4
39 52 30.0 092 33 40.0 4
MID FORK CHARITON RIVER
29 MACON CO HWY MAP
T/THOMAS HILL RESERVOIR 091391
SEC RD BRDG 5 MI WSW OF ATLANTA
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	12 30		0.128	1.600	0.063	0.005	0.060
74/10/12	12 50		0.040	6.000	0.050	0.045	1.250
74/11/02	11 50		0.490	2.350	0.070	0.020	0.360
74/12/07	12 20		2.000	3.200	0.085	0.060	0.250
75/01/04	11 10		0.815	1.400	0.256	0.015	0.090
75/02/01	11 00		0.464	1.000	0.040	0.016	0.090
75/03/01	11 25		1.600	1.400	0.096	0.020	0.140
75/04/05	12 00		1.570	2.400	0.075	0.020	0.230
75/04/19	15 05		0.280	2.000	0.055	0.035	0.330
75/05/04	11 50		0.345	1.050	0.050	0.010	0.100
75/05/17	11 20		0.270	1.350	0.060	0.010	0.070
75/06/07	11 10		1.700	1.550	0.045	0.015	0.210
75/08/23	10 30		0.030	2.000	0.045	0.030	0.120

STORET RETRIEVAL DATE 77/02/24

290581
39 40 06.0 092 39 06.0 4
STINKING CREEK
29 7.5 LAGONDA
T/THOMAS HILL RESERVOIR 091391
SEC RD BRDG 6 MI S OF CALLAO
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	11 05		0.152	2.400	0.070	0.010	0.095
74/10/05	09 50		0.056	2.000	0.360	0.010	0.155
74/10/27	14 00		0.032	2.100	0.035	0.015	0.160
74/12/07	13 25		1.320	3.100	0.310	0.140	0.460
75/01/04	14 30		1.500	1.900	0.368	0.030	0.180
75/02/01	10 20		0.760	1.200	0.152	0.040	0.150
75/03/02	10 00		1.570	1.150	0.156	0.016	0.030
75/04/08	14 30		1.350	2.900	0.570	0.040	0.235
75/04/19	09 15		0.005	2.400	0.140	0.015	0.100
75/05/04	15 00		0.150	1.550	0.050	0.020	0.160
75/05/17	10 00		0.210	2.100	0.090	0.025	0.380
75/06/07	10 00		1.200	4.400	0.080	0.030	
75/07/12	10 30		0.020	1.300	0.080	0.040	0.200
75/08/16	10 15		0.020	2.000	0.230	0.025	0.210

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STORET RETRIEVAL DATE 77/02/24

290582
39 46 50.0 092 38 00.0 4
STINKING CREEK
29 MACON CO HWY MAP
T/THOMAS MILL RESERVOIR 091391
SEC RD BRDG 1.5 MI NW OF CALLAO
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMHNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	15	20	0.108	1.400	0.060	0.020	0.185
74/10/05	10	20	0.032	2.000	0.280	0.015	0.185
74/10/27	14	20	0.032	2.200	0.315	0.030	0.250
74/12/07	10	25	2.320	2.700	0.165	0.125	0.280
75/01/05	10	20	1.540	1.400	0.368	0.012	0.070
75/02/01	10	15	1.010	1.300	0.280	0.016	0.090
75/03/01	10	40	1.900	1.950	0.224	0.008	0.140
75/04/05	10	40	1.250	1.950	0.530	0.025	0.140
75/04/19	09	50	0.005	0.950	0.030	0.015	0.095
75/05/04	10	00	0.025	1.100	0.610	0.010	0.130
75/05/17	10	15	0.030	2.300	0.140	0.010	0.130
75/06/08	10	35	0.750	3.150	0.145	0.030	0.260
75/07/12	10	20	0.120	2.750	0.390	0.020	0.320
75/08/16	10	15	0.020	4.400	0.300	0.045	

STORET RETRIEVAL DATE 77/02/24

2405C1
39 40 00.0 092 35 27.0 4
N FORK CLAYBANK CREEK
29 7.5 BEVIER SOUTH
T/THOMAS HILL RESERVOIR 091391
SEC NO BRDG 5.5 MI S OF BEVIER
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	11 30		0.060	2.300	1.900	0.010	0.015
74/10/05	10 15		0.024	2.000	1.600	0.015	0.020
74/10/27	14 15		0.056	1.600	0.890	0.005	0.010K
74/12/07	10 05		0.690	2.600	0.390	0.020	0.160
75/01/04	15 00		1.500	2.400	0.320	0.055	0.300
75/02/01	11 00		0.768	1.900	0.144	0.040	0.150
75/04/08	15 15		0.270	1.450	0.200	0.005	0.010
75/04/19	10 00		0.095	0.900	0.330	0.005	0.020
75/05/04	14 00		0.115	1.150	0.230	0.005K	0.030
75/05/17	10 30		0.390	0.600	0.050	0.005K	0.010
	11 00		0.050	1.300	0.925	0.005K	0.010K
75/06/07	10 45		0.130	1.800	0.610	0.005K	0.010
75/07/12	11 00		0.030	1.880	1.880	0.015	0.030
75/08/16	10 45		0.070	2.400	1.900	0.025	0.060

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

290501
39 47 45.0 092 36 40.0 4
SWEEZER CREEK
29 MACON CO HWY MAP
T/THOMAS HILL RESERVOIR 091391
SEC RD BRDG 2 MI NNE OF CALLAO
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	11 45		0.240	4.800	0.065	0.030	0.130
74/10/12	12 25		0.040	2.700	0.315	0.050	0.460
74/11/02	11 05		0.024	1.400	0.040	0.045	0.160
74/12/07	11 50		1.920	3.300	0.100	0.060	0.270
75/01/04	10 00		0.965	1.500	0.086	0.016	0.080
75/02/01	10 10		0.528	1.500	0.064	0.016	0.050
75/03/01	10 50		1.150	1.900	0.112	0.008	0.150
75/04/05	11 00		1.150	2.000	0.070	0.020	0.195
75/04/19	14 30		0.005	1.800	0.060	0.015	0.130
75/05/03	10 45		0.200	1.500	0.075	0.010	0.100
75/05/17	10 30		0.210	1.650	0.070	0.010	0.090
	11 50		0.035	0.100	0.030	0.005K	0.010K
75/06/07	10 10		0.920	1.550	0.110	0.025	0.210
75/06/22	12 35		0.010	1.250	0.035	0.015	0.110
75/07/12	08 20		0.200	1.450	0.075	0.010	0.100

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2905E1
39 49 40.0 092 40 45.0 4
UNNAMED CREEK
29 MACON CO HWY MAP
T/THOMAS HILL RESERVOIR 091391
CO HWY UU S MI NW OF CALLAO
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMONT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/14	15	00	0.036	1.300	0.315	0.005K	0.035
74/10/05	10	00	0.016	0.900	0.350	0.005K	0.045
74/10/27	14	00	0.016	0.500	0.185	0.015	0.030
74/12/07	10	05	0.312	1.200	0.145	0.040	0.150
75/01/05	10	05	0.204	0.800	0.092	0.010	0.010
75/02/01	10	55	0.168	0.900	0.136	0.032	0.050
75/03/01	10	20	0.230	1.550	0.232	0.008K	0.060
75/04/05	10	25	0.185	1.100	0.075	0.010	0.050
75/04/19	09	35	0.210	1.050	0.015	0.010	0.020
75/05/03	09	50	0.280	0.450	0.020	0.010	0.020
75/05/17	10	00	0.035	0.650	0.090	0.005	0.010
75/06/08	10	15	0.310	0.450	0.030	0.015	0.020
75/07/12	10	05	0.020	0.650	0.240	0.005	0.070
75/08/16	10	00	0.015	1.400	0.160	0.005	0.050

K VALUE KNOWN TO BE
LESS THAN INDICATED

34<33

STORET RETRIEVAL DATE 77/02/24

29051F
39 54 10.0 092 39 20.0 4
UNNAMED CREEK
29 MACON CO HWY MAP
T/THOMAS HILL RESERVOIR 091391
CO HWY HH 4 MI S OF ELMER
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/11/02	10 50		0.056	1.100	0.150	0.015	0.060
74/12/07	11 25		0.368	1.500	0.090	0.045	0.190
75/02/01	09 30		0.128	0.650	0.048	0.016	0.025
75/03/01	10 10		0.260	0.500	0.088	0.016	0.100
75/04/05	10 30		0.195	0.650	0.040	0.020	0.090
75/04/19	14 10		0.045	1.900	0.025	0.025	0.050
75/05/03	10 00		0.045	0.150	0.015	0.015	0.030
75/05/17	09 50		0.015	1.750	0.027	0.027	0.210
75/06/07	09 30		0.040	0.550	0.021	0.020	0.080
75/07/12	08 00		0.260	1.450	0.115	0.015	0.090

APPENDIX E

PARAMETRIC RANKINGS OF LAKES SAMPLED BY NES IN 1974

STATE OF MISSOURI

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
2901	CLEARWATER LAKE	0.017	0.150	445.000	3.567	10.400	0.004
2902	POMME DE TERRE RESERVOIR	0.043	0.275	449.928	9.443	14.800	0.008
2903	STOCKTON RESERVOIR	0.022	0.670	428.800	8.973	15.000	0.006
2904	LAKE TANEYCOMO	0.023	0.530	420.250	9.925	11.200	0.007
2905	THOMAS HILL RESERVOIR	0.062	1.040	487.684	5.787	11.200	0.011
2906	HAPPAPELLO RESERVOIR	0.033	0.105	459.667	9.642	11.000	0.004

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	1S- MIN DO	MEDIAN DISS ORTHO P	INDEX NO
2901	CLEARWATER LAKE	100 (5)	80 (4)	60 (3)	100 (5)	100 (5)	90 (4)	
2902	POMME DE TERRE RESERVOIR	20 (1)	60 (3)	40 (2)	40 (2)	20 (1)	20 (1)	
2903	STOCKTON RESERVOIR	80 (4)	20 (1)	80 (4)	60 (3)	0 (0)	60 (3)	
2904	LAKE TANEYCOMO	60 (3)	40 (2)	100 (5)	0 (0)	50 (2)	40 (2)	
2905	THOMAS HILL RESERVOIR	0 (0)	0 (0)	0 (0)	80 (4)	50 (2)	0 (0)	
2906	WAPPAPELLO RESERVOIR	40 (2)	100 (5)	20 (1)	20 (1)	80 (4)	90 (4)	